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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DCK EET NO.	CONFIRMATION NO.
06/905,052	07/12/2001	Hiroshi Samukawa	03310318001	3451

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EXAMINER

UMEZ ERONING, LYNETTE T

ART UNIT

PAPER NUMBER

1765

DATE MAILED: 06/04/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.	Applicant(s)	
09/05,052	SAMUKAWA, HIROSHI	
Examiner	Art Unit	
Lynette T. Umez-Eronini	1765	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
 - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
 - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
 - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) 1-8 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 9-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
 Paper No.(s)/Mail Date 3/3/2004
- 4) ☐ Interview Summary (PTO-413)
 Paper No.(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other _____

DETAILED ACTION

This communication is in response to Applicant's Remark in amendment filed 3/5/2004. Applicant presented persuasive arguments, which show the Takahashi et al. (US 6,233,821 B1) reference, although prior art under 102(e), disqualifies as prior art under 103(c) because Takahashi and the present application are assigned to Sony Chemicals Corp. Hence a new non-final rejection is presented

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 9-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admitted prior art in view of Suzuki et al. (US 6,218,022 B1), Hallden-Abberton et al (US 5,004,777) and/or Wilson et al. (US 4,369,090).

Applicant's prior art teaches, "... a coating solution containing a polyimide precursor polyamic acid is applied and dried to form a precursor layer 122 based on the polyamic acid (FIG. 8(b)). Then the assembly is heated to imidate the polyamic acid contained in precursor layer 122. Then, ... the resin layer 123 is exposed and developed to form an alkali-resistant resist layer patterned in a predetermined shape. ... and resin layer 123 is exposed at the bottom of this opening 130. Then, the assembly is immersed into an etching solution to remove resin layer 123 exposed at the bottom of opening 130 (etching). Resin layer 123 formed on the surface ... has openings 130 at the bottom ..." (Specification, page 1, line 20 – page 2, line 14). "Known etching solutions used for the process of etching resin layer 123 include those containing ... an alcohol, an amine and water ..." (Specification, page 2, lines 19-23). "Amine-free solutions consisting of an alkali compound such as tetramethylammonium hydroxide ... have been proposed" (Specification, page 2, lines 30-33). The aforementioned reads on,

A method for etching a resin layer, comprising:

forming a film-like resin layer based on a polyimide;

providing a resist layer having an opening at a position on a surface of the resin layer; and

etching with an alkali compound that comprises at least one selected from the group consisting of an alkali metal hydroxide and a quaternary ammonium hydroxide, **in claims 9 and 10;**

forming a film-like resin layer comprises applying a coating solution, **in claims 13 and 14;**

A method for manufacturing a flexible wiring board comprising:

applying a coating solution containing a polyimide precursor on a side of a substrate having at least a metal wiring on which the metal wiring is provided;

drying the coating solution to form a precursor layer based on a polyimide;

heating the precursor layer to form a polyimide resin layer;

applying a resist layer coating solution on a surface of the resin layer;

drying the resist layer coating solution to form a resist layer;

patterning the resist layer in a shape to form an opening;

preparing an etching solution; and

bringing the etching solution in contact with the resin layer located at a bottom of the opening to etch the resin layer, **in claim 15;**

A method for manufacturing a flexible wiring board comprising:

applying a coating solution containing a polyimide on the side of a substrate having at least a metal foil;

drying the coating solution to form a resin layer;

applying a resist layer coating solution on a surface of the resin layer;

drying the resist layer coating solution to form a resist layer;

patterning the resist layer in a shape to form an opening;

preparing an etching solution;

bringing the etching solution into contact with the resin layer located at a bottom of the opening to etch the resin layer; and

providing a resist layer having an opening at a desired position on the opposite side to a side of the metal foil on which the resin layer is formed to remove the metal foil exposed at a bottom of the opening in the resist layer, **in claim 16**;

A method for manufacturing a flexible wiring board comprising:

applying a coating solution containing a polyimide on the side of a substrate having at least a metal wiring on which the metal wiring is provided;

drying the coating solution to form a resin layer;

applying a resist layer coating solution on a surface of the resin layer;

drying the resist layer coating solution to form a resist layer;

patterning the resist layer in a shape to form an opening;

preparing an etching solution; and

and bringing the etching solution into contact with the resin layer located at a bottom of the opening to etch the resin layer, **in claim 17**; and

A method for manufacturing a flexible wiring board comprising:

applying a coating solution containing a polyimide on the side of a substrate having at least a metal foil;

drying the coating solution to form a resin layer;

applying a resist layer coating solution on a surface of the resin layer;

drying the resist layer coating solution to form a resist layer;

patterning the resist layer in a shape to form an opening;

preparing an etching solution;

bringing the etching solution into contact with the resin layer located at a bottom of the opening to etch the resin layer; and

and providing a resist layer having an opening at a position on the opposite side to a side of the metal foil on which the resin layer is formed to remove the metal foil exposed at a bottom of the opening in the resist layer, **in claim 18**.

Applicant's prior art fails to teach bringing an etching solution at 65°C or more into contact with the resin layer, wherein the etching solution comprises 3 to 65% by weight alcohol, 10 to 55% by weight alkali compound and water in a weight of 0.75 to 3.0 times a weight of the alkali compound, and wherein the alcohol comprises at least one selected from the group consisting of a diol containing from 3 to 6 carbon atoms and a triol containing from 4 to 6 carbon atoms, **in claims 9, 10, 15, 16, and 18**;

Suzuki teaches, "A resin etching solution containing . . . an alkali metal compound and water, or an aliphatic alcohol, an aliphatic amine, . . . and a process for etching a polyimide film . . ." (Abstract). "In addition, the alkali metal compound is most preferably potassium hydroxide . . . but other substances such as sodium hydroxide and lithium hydroxide may also be used, . . ." (column 3, lines 53-57). "Also, they may used in concentrations of about 10-48% is preferred" (column 3, lines 57-64). "The resin etching solution . . . comprises . . . propylene glycol (same as applicant's diol)" . . . they are used in a range of 1%-40%, and most preferably 5%-30% (column 4, lines

23-51). Table 2 (column 10, lines 33-43) lists the composition of potassium hydroxide and water having the same wt %. Hence, one can see that the concentration of the etchant components encompasses those of the claimed invention. Suzuki further teaches, "The etching temperature . . . is generally in the range of 20°C to the boiling point of the system, and preferably 30°C-90°C" (column 4, lines 1-4).

It would have been obvious to one having ordinary skill in the art at the time of the claimed invention to modify applicant's prior art by employing a resin etching solution that comprises a 3 to 6 carbon diol, water, and alkali metal hydroxide, encompasses 3 to 65% by weight alcohol, 10 to 55 % by weight alkali compound, and 0.75 to 3 wt % water, and etches polyimide within a temperature of 65°C, as taught by Suzuki for the purpose of rapidly etching polyimides (Suzuki, column 2, lines 48-57).

Applicant's admitted prior art in view of Suzuki differs in failing to teach a polyimide having an imidation degree of from 50 to 98, **in claims 9, 10, 13, 16, 17, and 18**; an imidation degree of less than 50%, **in claims 11 and 12**; and an imidation degree of from 50 to 98% and also an imidation degree of less than 50%, **in claim 15**.

Hallden-Abberton illustrates that the degree of imidization can be controlled to obtain desired product characteristics (column 6, lines 10-45). A preferred range is from 25-95% (column 6, lines 18-20).

Wilson illustrates that the degree of imidation is proportional to the etch rate of the resin (column 6, lines 3-16).

It would have been obvious to one having ordinary skill in the art at the time of the claimed invention to select any specific range of imidation degrees of polyimide in the prior art or record and the Suzuki reference, including applicant's specifically claimed range of imidation because the reference of Hallden-Abberton, suggests that the degree of imidization can be selected to obtain desired product characteristics.

In addition, it would have been obvious to one of ordinary skill in the art at the time the invention was made to select any degree of imidization that would provide a desired etch rate because the reference of Wilson illustrates that the degree of imidization is proportional to the etch rate of the resin.

It is noted that applicant's "imidation" is the same as "imidization" that is reference in the prior art of record.

Conclusion

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Sasaki et al (US 4,473,523) illustrate a desirable insulator with 90% imidization (column 10, lines 38-44 and column 13, lines 5-11).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lynette T. Umez-Eronini whose telephone number is 7571-272-1470. The examiner is normally unavailable on the First Friday.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 571-272-1465. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9310.

Itue

June 1, 2004

NADINE G. NORTON
SUPERVISORY PATENT EXAMINER

Nad Nort